Claims

[1] A composite core for an electrical cable comprising:
an inner core consisting of advanced composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin;
an outer core consisting of low modulus composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin; and
an outer film surrounding the composite core;
wherein, the composite core comprises a tensile strength of at least 160 Ksi.

[2] A composite core as claimed in claim 1, wherein the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene, steel hardwire filaments, steel wire, steel fiber, high carbon steel cord with adhesion optimized coatings, high carbon steel cord without adhesion optimized coatings and carbon nanofibers.

[3] A composite core as claimed in claim 1, wherein the advanced composite material comprises at least one fiber comprising a modulus of elasticity in the range of about 15 to about 45 Msi and a tensile strength in the range of at least about 350 Ksi to about 1000 Ksi.

[4] A composite core as claimed in claim 1, wherein the low modulus composite material comprises at least one fiber comprising a modulus of elasticity in the range of at least about 6 Msi to about 15 Msi and a tensile strength of at least about 180 Ksi to about 300 Ksi.

[5] A composite core as claimed in claim 1, wherein the outer film is selected from the group consisting of
Kapton, Teflon, Tefzel, Tedlar, Mylar, Melonix, Tednex, PEN and PET.

[6] A composite core as claimed in claim 1 wherein the substantially continuous reinforced fiber type is twisted.

[7] A composite core as claimed in claim 1 wherein the composite core is surrounded by at least one layer of conductor.

[8] A composite core for an electrical cable comprising:
two or more types of reinforced fiber types in a resin matrix, said core further comprising:
at least 50% fiber volume fraction, wherein at least one fiber comprises a modulus of elasticity at least about 15 (151 GPa) to 45 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of at least about -0.6×10^{-6} / °C to about 1.0×10^{-5}/°C and a tensile strength at least about 250 ksi (2413 MPa) and at least one fiber comprising a modulus of elasticity of at least about 9 Msi, a

coefficient of thermal expansion in the range of about 5 x 10^{-6}/°C to about 10 x 10^{-6}/°C and a tensile strength of at least about 180 Ksi (1241 MPa); and
an outer film surrounding the composite core.

[9] A composite core as claimed in claim 8, wherein the outer film is selected from the group consisting of Kapton, Teflon, Tefzel, Tedlar, Mylar, Melonix, Tednex, PEN and PET.

[10] A composite core as claimed in claim 8, wherein the substantially continuous reinforced fiber type is twisted.

[11] A composite core as claimed in claim 8, wherein the composite core is surrounded by at least one layer of conductor.

[12] A method of processing a composite core for an electrical cable comprising:
pulling one or more types of longitudinally oriented and substantially continuous fiber types through a resin to form a fiber resin matrix;
removing excess resin from the fiber resin matrix;
processing the fiber resin matrix through at least one first die type to compress the fibers into a geometric shape determined by the at least one die;
introducing an outer film;
wrapping the outer film around the composite core;
processing the fiber resin matrix through at least one second die type to compress the composite core and coating; and
curing the composite core and coating.

[13] A method as claimed in claim 12 wherein, the composite core comprises at least one fiber selected from the group consisting of: carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene, steel hardwire filaments, steel wire, steel fiber, high carbon steel cord with adhesion optimized coatings, high carbon steel cord without adhesion optimized coatings and carbon nanofibers.

[14] A method as claimed in claim 12 wherein, the outer film is selected from the group consisting of Kapton, Teflon, Tefzel, Tedlar, Mylar, Melonix, Tednex, PEN and PET.

[15] A method as claimed in claim 12 wherein, the step of wrapping the fiber resin matrix further comprises using one or more carding plates to shape and compress the film around the core.